

SONGINA, O.A.

Oxidation-reduction reactions in amperometric (polarometric) titration.  
Izv. AN Kazakh. SSR. Ser. khim. no.1:86-93 '60. (MIRA 13:11)  
(Oxidation-reduction reaction) (Conductometric analysis)

ROZHDESTVENSKAYA, Z.B.; SONGINA, O.A.

Polarographic reduction of halogenates and their oxidation potentials.  
Zhur.anal.khim. 15 no.2:138-146 Mr-Apr '60. (MIRA 13:7)

1. Kazakhskiy gosudarstvennyy universitet, Alma-Ata.  
(Halates)

SONGINA, O. A.

Some characteristics of polarometric titration with a rotating  
platinum electrode. Coll Cz Chem 25 no.12:3179-3187 D '60.  
(EEAI 10:9)

1. Kazakhskiy gosudarstvenniy universitet im. S. M. Kirova, Alma-Ata,  
SSSR.

(Polarograph and polarography) (Electrodes)  
(Platinum)

SAVITSKAYA, I.S.; SONGINA, O.A.

Amperometric titration With two indicator electrodes (dead stop end point); survey. Zav.lab. 26 no.3:282-287 '60. (MIRA 13:6)  
(Conductometric analysis)

ZAKHAROV, V.A., SONGINA, O.A., DRAGAVTSEVA, N.A.

Amperometric determination of arsenic and antimony. Zav. lab.  
26 no.5:537-540 '60. (MIRA 13:7)

1. Kazakhskiy gosudarstvennyy universitet.  
(Arsenic--Analysis) (Antimony--Analysis)

ZAKHAROV, V.A., SONGINA, O.A., TERZEMAN, L.N.

Amperometric method of determining mercury on a rotating  
platinum electrode. Zav.lab. 26 no.7:787-792 '60.

(MIRA 13:7)

1. Kazakhskiy gosudarstvennyy universitet im S.M. Kirova.  
(Mercury--Analysis) (Electrodes, Platinum)

STUDENSKAYA, L.S.; SONGINA, O.A.

Determination of vanadium in steel and ferroalloys by amperometric titration with two indicator electrodes. Zav.lab 26 no.10:1102-1104 '60. (MIRA 13:10)

1. Ural'skiy nauchno-issledovatel'skiy institut chernykh metallov i Kazakhskiy gosudarstvennyy universitet.  
(Vanadium--Analysis) (Steel--Analysis) (Iron alloys)

SONGINA, O.A.; ZAKHAROV, V.A.

Some particular features of amperometric (polarimetric) titration  
by means of a rotating platinum electrode. Izv.AN Kazakh. SSR.  
Ser.khim. no.1:52-59 '61. (MIRA 16:7)  
(Conductometric analysis) (Electrodes, Platinum)



KUZ'MINA, N.N.; SONGINA, O.A.

Oxidation of thiourea on a rotating platinum anode. Izv.vys.ucheb.  
zav.; khim.i khim.tekh. 4 no.6:928-935 '61. (MIRA 15:3)

1. Kuybyshevskiy industrial'nyy institut imeni V.V.Kuybysheva i  
Kazakhskiy gosudarstvennyy universitet imeni Kirova.  
(Urea) (Oxidation) (Electrodes, Platinum)

SONGINA, O.A.; KHODASEVICH, S.A.

Part played by Zimmerman-Reinhardt's solution in the permanganometric determination of iron. Zhur.anal.khim. 16 no.5:516-522 S-O '61.  
(MIRA 14:9)

1. Kazakh State University, Alma-Ata.  
(Iron--Analysis)

.SONGINA, O.A.; SAVITSKAYA, I.S.

Effect of the dimensions of cathode and anode on the shape  
of a curve in amperometric titration with two indicator  
electrodes. Zav.lab. 27 no.9:1068-1074 '61. (MIRA 14:9)

1. Kazakhskiy gosudarstvennyy universitet i Bashkirskiy gos-  
udarstvennyy universitet.  
(Conductometric analysis)

SORGINA, O.A.; PAVLOVA, I.M.

Electrooxidation of a rhodanide ion on the platinum electrode.  
Izv.vys.ucheb.zav.;khim i khim.tekh. 5 no.3:372-382 '62.  
(MIRA 15:7)

1. Kazakhskiy gosudarstvennyy universitet imeni Kirova,  
kafedra khimii redkikh elementov.  
(Oxidation, Electrolytic) (Electrodes, Platinum)

KUZ'MINA, N.N.; SONGINA, O.A.

Amperometric determination of selenium in sulfur by means of thiourea. Zhur.anal.khim. 17 no.4:495-498 J1 '62. (MIRA 15:8)

1. V.V.Kuibyshev Industrial Institute, Kuibyshev and S.M.Kirov  
Kazakh State University, Alma-Ata.  
(Selenium—Analysis) (Conductometric analysis)

SONGINA, O.A.; DAUSHEVA, M.R.; KHODASEVICH, S.A.

Amperometric titration of manganese with permanganate in the presence of pyrophosphate. Zhur.anal.khim. 17 no.8:966-971 N '62. (MIRA 15:12)

1. S.M.Kirov Kazakh State University, Alma-Ata.  
(Manganese—Analysis) (Conductometric analysis)

ZAKHAROV, V. A.; VOYLOSHNIKOVA, A. P.; SONGINA, O. A.

Amperometric determination of tri- and pentavalent arsenic in ores.  
Zav.lab. 28 no.1:27-28 '62. (MIRA 15:2)

1. Kazakhskiy gosudarstvennyy universitet im. S. M. Kirova i  
Institut khimii AN Kazakhskoy SSR.  
(Arsenic—Analysis)

SONGINA, O.A.; ZAKHAROV, V.A.

Shape of curves of the amperometric titration of mercury with  
potassium iodide as determined by the indicator electrode potential.  
Zav.lab. 28 no.8:908-910 '62. (MIRA 15:11)

1. Kazakhskiy gosudarstvennyy universitet imeni S.M.Kirova.  
(Mercury--Analysis) (Conductometric analysis)



ZAKHAROV, V.A.; SONGINA O.A. (Alma-Ata)

Behavior of iodide and iodine on the pl num microelectrode.  
Zhur. fiz. khim. 36 no.6:1226-1231 Je'62 (MIRA 17:7)

1. Kazakhskiy gosudarstvennyy universitet imeni Kirova.

SONGINA, O.A.; TOYBAYEV, B.K.

Reduction potentials of dissolved oxygen on a platinum electrode.  
Izv.AN Kazakh. SSR. Ser.tekh.i khim.nauk no.1:8-10 '63.  
(MIRA 17:3)

ROZHDESTVENSKAYA, Z.B.; GLADYSHEV, V.P.; SONGINA, O.A.

Oscillographic investigation of the reduction of some oxygen-containing anions in sulfuric acid solutions. Izv. AN Kazakh. SSR. Ser. tekhn. i khim. nauk no.2:8-14 '63. (MIRA 17:2)

L 11058-63 EWP(q)/EWT(2)/BDS—AFFTC/ASD/ESD-3—RM/JD  
 ACCESSION NR: AP3000479 S/0153/63/006/001/0163/0164

6 D  
 59

AUTHOR: Nevzorov, A. N.; Songina, O. A.

TITLE: oxalate complex compounds of niobium and tantalum

SOURCE: Izv. VUZ: Khimiya i khim. tekhnologiya, v. 6, no. 1, 1963, 163-164

TOPIC TAGS: niobium oxalate complexes, tantalum oxalate complexes, K sub 3, NbO trioxalate, 2H sub 2 O, K sub 5, Nb oxalate sub 5

ABSTRACT: The authors investigate the composition, properties, and formation conditions different from those in previous studies for complex oxalate compounds of niobium and tantalum. The preparation method finally selected for the niobium oxalate complexes was as follows: dried niobium hydroxide was dissolved in hot concentrated oxalic acid solution. The solution was then neutralized with KOH to a pH of 3 to 3.5, during which time excess oxalate separated out as potassium bioxalate. The filtrate was evaporated to a niobium concentration of 100 to 120 gm/l and cooled to room temperature, whereupon a crystalline precipitate was obtained. Analysis of the mother liquor and of the precipitate showed a ratio of Nb to oxalate ion of 1:3. The precipitate composition corresponds to the formula K sub 3 [NbO trioxalate]. 2H sub 2 O. It loses one molecule of water at 100C, the other

Card 1/2

L 11058-63

ACCESSION NR: AP3000479

at 140C, and decomposes at 220C with evolution of carbon dioxide. The solubility of the salt at 25C is 160 gm/l and at 100C - 1000 gm/l. Dissolving the precipitate in water increases the pH to 3.5 - 4.0 as a result of slight hydrolysis of the oxalate complex. By varying the pH it was determined that the potassium oxalic niobate was stable in the region of pH - 2.5 to 4.5 and crystallized out of any such solution by evaporation. The authors were unable to prepare a previously described K sub 5 complex [Nb oxalate sub 5]. A tantalum oxalate complex obtained by a similar process had a molecular ratio Ta: oxalate:K of 1:1:1. This compound is thought to correspond to either KTa(OH) sub 4 oxalate or KTaO sub 2 oxalate. It hydrolyzes in water, but readily dissolves in a solution of pH less than 3. Orig. art. has: 1 table.

ASSOCIATION: Kafedra khimii redkikh elementov, Kazakhskiy gosudarstvennyy universitet im. S. M. Kirova (Department of Rare Element Chemistry, Kazakh State University)

SUBMITTED: 31Jan62

DATE ACQD: 21Jun63

ENCL: 00

SUB CODE: CH

NO REF SOV: 002

OTHER: 003

*Sw/wm*  
Card 2/2

KUZ'MINA, N.N.; SONGINA, O.A.

Oxidation of sulfite, sulfide, and thiosulfate on a rotating  
platinum anode. Izv.vys.ucheb.zav.;khim. i khim.tekh. 6  
no.2:201-203 '63. (MIRA 16:9)

1. Kuybyshevskiy industrial'nyy institut imeni V.V.Kuybysheva i  
Kazakhskiy gosudarstvennyy universitet imeni S.M.Kirova, kafedra  
analiticheskoy i fizicheskoy khimii.  
(Sulfur compounds) (Oxidation, Electrolytic)

SONGINA, O.A.; ROZHDESTVENSKAYA, Z.B.

Article by Vikt.Spitsyn, G.M.Nesmeianova, E.A.Kanovskii "Certain problems of the thermodynamics and kinetics of solution of uranium oxides in an acid medium," discussed by O.A.Songina, Z.B.Rozhdestvenskaia. Zhur.neorg.khim. 8 no.3:781-782 Mr '63. (MIRA 16:4)

(Uranium oxides) (Solution (Chemistry)) (Spitsyn, Vikt.)  
(Nesmeianova, G.M.) (Kanovskii, E.A.)

1. Kuznetskiy, N. I.

Composition of thiocyanate complexes of silver formed during  
amperometric titration. Zhur. anal. khim. 18 no.3, 323-  
328. M-163. (MIRA 1974)

2. Kuznetskiy, N. I. Institut i Kazakhskiy  
gosudarstvennyy universitet.



OSPANOV, Kh.K.; ROZHDESTVENSKAYA, Z.B.; SONGINA, O.A.

Polarographic study of unithiol on a dropping mercury electrode.  
Zhur.anal.khim. 18 no.4:430-434 Ap '63. (MIRA 16:6)

1. S.M.Kirov Kazakh State University, Alma-Ata.  
(Propanesulfonic acid) (Polarography)  
(Electrodes, Dropping mercury)

SONGINA, O.A.; STUDENSKAYA, L.S.

Interaction of the electrode material with a solution in the presence of oxidizing agents. Zhur.anal.khim. 18 no.10:1269-1271 O '63.

(MIRA 16:12)

1. Kazakh State University, Alma-Ata and Ural Scientific-Research Institute of Ferrous Metals, Sverdlovsk.

S/032/63/029/001/006/022  
B101/B186

AUTHORS: Rozhdestvenskaya, Z. B., Songina, O. A., and Barikov, V. G.  
TITLE: Amperometric determination of uranium by a graphite electrode  
PERIODICAL: Zavodskaya laboratoriya, v. 29, no. 1, 1963, 30 - 33

TEXT: The amperometric titration with Trilon B is described for solutions containing  $10^{-3}$  -  $10^{-8}$  g uranium. Using a platinum electrode the current was very unstable, probably in consequence of oxidation and complex formation, so a graphite rod as usually employed in spectrum analyses was adopted as electrode. This gave stable amperages at low concentrations. The potential of graphite was +0.2 v as measured against a mercury iodide reference electrode. U(VI) was reduced with formamidine sulfonic acid to U(IV). The solution heated by the reduction process had to be cooled to room temperature since temperature variations affected the result.  $Hg(NO_3)_2$  served as indicator. The pH of the solution to be titrated should be 1.5 - 2. At very low concentrations the end point of titration becomes indistinct through blurring of the titration curve, but it can be

Card 1/2

MISHCHENKO, A.I.; SONGINA, O.A.

Determination of silver by the anodic iodide amperometric method.  
Zav.lab. 29 no.2:162 '63. (MIRA 16:5)

1. Kazakhskiy gosudarstvennyy universitet.  
(Silver--Analysis) (Conductometric analysis)

SONGINA, O.A.; SAVITSKAYA, I.S.

Determination of  $V^{4+}$  and  $V^{5+}$  by the method of amperometric titration  
with two indicator electrodes. Zav.lab. 29 no.4:401-402 '63.  
(MIRA 16:5)

1. Kazakhskiy gosudarstvennyy universitet im. S.M.Kirova.  
(Vanadium—Analysis) (Conductometric analysis)

SHARIPOV, R.K.; SONGINA, O.A.

Electrochemical determination of molybdenum based on the catalytic  
oxidation of iodide by hydrogen peroxide. Zav.lab. 29 no.11:  
1293-1296 '63. (MIRA 16:12)

1. Kazakhskiy gosudarstvennyy universitet im. S.M.Kirova.

ZAKHAROV, V.A.; SONGINA, O.A.

Effect of iodide on the polarographic behavior of oxygen on a platinum electrode. Zhur.fiz.khim. 37 no.7:1450-1454 J1 '63. (MIRA 17:2)

1. Kazakhskiy gosudarstvennyy universitet.

1. KAZAKHSTAN. - Alma-Ata: Izdatel'stvo Kazakhskogo gosudarstvennogo universiteta im. S.M. Kirova, 1971. 568 p. (MIRA 17:11)

[Rare metals] Kedkie metally. 120.3., perer. i dop. Kazakhskaya Metallurgiya, 1971. 568 p. (MIRA 17:11)

1. Kazakhskiy Gosudarstvennyy universitet im. S.M. Kirova, Alma-Ata (for Songina).



L E-073-65 EWT(m)/EWP(t)/EWP(b) IJP(c), JD/JG  
ACCESSION NR: AP5001770 S/0063/64/009/006/0697/0698

AUTHOR: Songina, O. A.; Kemeleva, N. G.; Ustimov, A. M.

TITLE: Amperometric determination of cerium and total rare earth elements

SOURCE: Vsesoyuznoye khimicheskoye obshchestvo. Zhurnal, v. 9, no. 6, 1964, 697-698

TOPIC TAGS: direct oxidative cerium titration, cerium 4, amperometric cerium determination, amperometric rare earths determination

ABSTRACT: Direct oxidative titration of cerium (IV) by oxalate was used, which is suitable for the further amperometric determination of the sum of rare earth elements (REE) as oxalates by means of permanganate. This direct determination may be carried out in the presence of other REE as well as other elements, since none of these can be oxidized under these conditions, and no byproducts will be found in the solution at the end of the reaction. The specimens were dissolved in sulfuric acid, cerium was oxidized by ammonium persulfate in the presence of silver nitrate. The excess ammonium persulfate was removed by boiling

Card 1/2

L 25073-65

ACCESSION NR: AP5001770

and the cooled solution used for amperometric determination, in a nitric acid base electrolyte, first of Ce, then of the sum of REE. Comparison of results with those obtained by weighing the oxalate precipitate showed satisfactory agreement. "The student S. Sinitskaya and the laboratory technician P. I. Maslova took part in the amperometric titration." Orig. art. has: 1 table

ASSOCIATION: Kazakhskiy gosudarstvennyy universitet (Kazakhstan State University)

SUBMITTED: 10Dec63

ENCL: 00

SUB CODE: IC, GC

NR REF SOV: 003

OTHER: 002

Card 2/2

SONGINA, O.A.; OSPANOV, Kh.K.; ROZHDESTVENSKAYA, Z.B.

Polarographic study of the electrolytic oxidation of unithiol  
on a platinum electrode. Zhur. anal. khim. 19 no.2:168-173 '64.  
(MIRA 17:9)

1. Kazakhskiy gosudarstvennyy universitet imeni Kirova,  
Alma-Ata.

BARIKOV, V.G.; SOGINA, O.A.

Graphite electrode in electrochemical methods of analysis (survey).  
Zav. lab. 30 no.1:5-8 '64. (MIRA 11:6)

JOYICHENKOVA, A.P.; SOMINA, V.S.

Amperometric determination of nitrite in the presence of Fe<sup>3+</sup>.  
Zav. lab. 30 no.1:18-20 1961.

1. Kazakhskiy tekhnologicheskii institut i Kazanskii gosudarstvennyy universitet.

SORGINA, O.A.; GSPANOV, Kh.K.; ROZHDESTVENSKAYA, Z.B.

colorimetric titration of gold by an unithiol solution. Zav.  
kh. 30 no.6:664-667 '64 (MIRA 17:5)

L. Kazakhskiy gosudarstvennyy universitet imeni Kirova.

ZAKHAROV, V.A.; SONGINA, O.A.

Anodic oxidation of arsenite ion on a rotating platinum electrode. Zhur. fiz. khim. 38 no.3:767-770 Mr '64.

(MIRA 17:7)

1. Kazakhskiy gosudarstvennyy universitet.

ПАВЛОВИЧ, А. И.; ПОНОМА, О.А.

Polarographic behavior and amperometric titration of gold on  
a rotating platinum wire electrode. Zhur. anal. khim. 19  
no. 3:303-307 '64. (MIRA 17:9)

1. Kazakhskiy gosudarstvennyy universitet, Alma-Ata.



.....

.....  
.....  
.....  
.....

111A 17:10

.....  
.....

PASHCHENKO, A.I.; SONGINA, O.A.

Amperometric determination of silver and gold in blister copper.  
Zav. lab. 30 no.9:1064-1066 '64. (MIRA 18:3)

1. Kazakhskiy gosudarstvennyy universitet imeni Kirova.

BARIEV V. K.G.; BUNGINA, O.A.

Determination of the microquantities of mercury by the method  
of deposition on and removal from a graphite electrode. Izv. lab.  
33 no.10:1134-1137 '64. (MIRA 18:4)

1. Kazakhskiy gosudarstvennyy universitet imeni Al-Farabi.

L 50212-65 EWT(m)/EWP(t)/EWP(b) IJP(c) JD/GS

ACCESSION NR: AT5008404

S/0000/64/000/000/0055/0059

AUTHOR: Songina, O. A.; Mishchenko, L. V.

41

18  
B+1

TITLE: Polarographic determination of indium in the presence of tin in sulfosalicylate and fluoride-sulfosalicylate supporting electrolytes

SOURCE: AN SSSR. Sibirskoye otdeleniye. Khimiko-metallurgicheskiy institut. Khimicheskiy analiz tsvetnykh i redkikh metallov (Chemical analysis of nonferrous and rare metals). Novosibirsk, Redizdat Sib. otd. AN SSSR, 1964, 55-59

TOPIC TAGS: indium, chemical analysis, polarographic analysis

ABSTRACT: A polarographic method was developed for determining indium in the presence of very large amounts of tin in a sulfosalicylic acid supporting electrolyte. A Heyrovsky polarograph was used. The maximum sensitivity of the galvanometer was  $2 \cdot 10^{-9}$  a/mm. The capillary characteristics were  $m^{2/3}t^{1/6} = 3.19$ . Saturated calomel electrodes were used as the anode. Indium polarograms were taken in sulfosalicylic acid with concentrations from  $5 \cdot 10^{-2}$  to 1 M in a pH range of 2-6. It was found that under these conditions indium gives well defined waves which could be analytically useful. Above pH 6 indium gives no wave. Within a pH range of 3-5 sulfosalicylic acid shifts  $E_{1/2}$  of indium toward negative values, but has essential

Card 1/2

L 50212-65  
ACCESSION NR: AT5008404

ly no effect on the wave height. It was determined that in a 1 M sulfosalicylic acid solution at pH = 3.5-4.2 it is possible to determine as little as 2 µg/ml of indium in the presence of large quantities of tin. Here the pH of the solution must be rigorously controlled. The use of a mixed fluoride-sulfosalicylate supporting electrolyte consisting of 1 M sulfosalicylic acid and 0.2 M NH<sub>4</sub>F solution enables the determination of indium in the presence of tin in 3.5-5.5 pH range. Orig. art. has: 3 figures and 1 table.

ASSOCIATION: none

SUBMITTED: 01Sep64

ENCL: 00

SUB CODE: GC

NO REF SOV: 008

OTHER: 004

*ml*  
Card 2/2

SHARIPOV, R.K.; SOMINA, O.A.

Polarographic study of the catalytic waves of hydrogen peroxide  
reduction in the presence of zirconium. Zhur. anal. khim. 19 no.11:  
1322-1325 '64. (MIRA 18:2)

1. Kazakh State University, Alma-Ata.

SONGINA, O.A.; USUYALSOV, A.A.

Modified type of a reference electrode for amperometric titration.  
Zav. lab. 30 no.11:1419-1420 '64 (MIRA 18:1)

1. Kazakhskiy gosudarstvennyy universitet.

1. KAZAKHSTAN, U.S.S.R. 0..

Interaction between electrode mercury and oxidizing agents.  
Dokl. Akad. Nauk Kazakhsk. SSR. 38 no.7:1728-1733 J1 '64.

(MIRA 18:3)

1. Kazakhskiy gosudarstvennyy universitet, Alma-Ata.



ZAKHAROV, L.N.; DOROSHIN, O.A.

Effect of iodide on the polarographic behavior of II- and trivalent iron on a platinum electrode. Zhur. fiz. khim. 38 no.10:2474-2478 0 1961. (MIRA 18:2)

1. Kazakhskiy gosudarstvennyy universitet, Alma-Ata.



YUSUPOVA, A.B.; SONGINA, O.A.

Solubility of some copper minerals and rhenium disulfide  
in various solvents. Izv. AN Kazakh. S. R. Ser. khim. nauk 15  
no. 3:15-20 JL-Ag '65. (MIRA 18:11)

1. Submitted December 24, 1964.

SONGINA, O.A.; OSPANOV, Kh.K.; ROZHDFSTVENSKAYA, Z.B.

Amperometric titration of univalent and divalent mercury with  
a solution of unithiol. Zhur. anal. khim. 20 no.1 55-58-165.  
(MIRA 18:3)

1. Kazakhskiy gosudarstvennyy universitet imeni Kirova, Alma-Ata.



CHEN, C. C.; WILKINSON, T. M.; KLUBNICHKIN, K. E.; SHAPIRO, I. S.

Here metals and technological progress. Review of the book  
by L. Stepanov. Tsvet. met. 38 no.6:95 Je '65.

(M.F.A. 18.10)

1. NOVIK, I.P.; SAVILKAYA, I.S.

Effect of imprinted in the determination of zinc by the  
cyanide amperometric method with the indicator electrode.  
Zav. lab. 31 no.3:259-262 '65. (1965)

1. Reliability goudarstvennyy on vnesen: M. S.M. 1965.

SONGIMA, T.A.

Amperometric titration; a survey. Zav.lab. 31 no.10:1163-1172  
'65. (MIRA 19:1)



PASHCHENKO, A.I.; SONGINA, O.A.; KARGINA, N.I.

Amperometric titration of gold with thiourea. Zav. lab. 31 no.11:  
1312-1314 '65. (MIRA 19:1)

1. Kazanskiy gosudarstvennyy universitet.

SONGINA, O.A.; DAUSHEVA, M.P.

Electrochemical reduction of sparingly soluble mercury compounds. *Elektrokhimiia* 1 no.12:1464-1468 D '65. (MIRA 19:1)

1. Kazakhskiy gosudarstvennyy universitet imeni S.M.Kirova.  
Submitted March 13, 1964.

SONHOFFER, Szilare; GERO, Sandor

Disturbances of lipid metabolism. *Magy. Tudom. Akad. Biol. Orv. Oszt. Kozl.* 8 no.1-2:49-58 1957.

1. A Pecsí Orvostudományi Egyetem Kóreltani Intézete és a  
Budapesti Orvostudományi Egyetem III. Belklinikája.  
(LIPIDS, metab.  
disord. (Hun))

ЕКОЛОВ, Н.С.; СОННИЧ, И.П.

$\alpha$ -Furyl- $\beta$ -aminoaryl ketones. Zhur. ob. khim. 34 no. 3:927-929  
Mr '64. (MIRA 17:6)

1. Permskiy pedagogicheskiy institut.

SONICHEV, S.

Grades and actual knowledge. Prof.-tekhn.obr. 13 no.3:10-13  
Mr '56. (MLRA 9:7)

1.Zaveduyushchiy metodicheskim kabinetom Sverdlovskogo  
oblastnogo upravleniya trudovykh rezervov.  
(Technical education) (Grading and marking (Students))

SONICHEV, S.

Still a word on the quality of lessons. Prof. -tekhn. obr. 13  
no.8:11-13 Ag '56. (MLRA 9:10)

1. Zaveduyushchiy metodicheskim kabinetom Sverdlovskogo  
oblastnogo upravleniya trudovykh rezervov.  
(Technical education)

SONIEWSKI, W.

"Series capacitors."

Pt. 1. p. 307 (Wiadomosci Elektrotechniczne) Vol. 17, no. 12, Dec. 1957  
Warsaw, Poland

SO: Monthly Index of East European Accessions (EEAI) LC. Vol. 7, no. 4,  
April 1958

111 100 100 100  
MYNKIN, P.V.; SONIN, A.A.

Automatic push-rod stamping press. Avt.trakt.prom. no.4:insert  
Ap '55. (MIRA 8:5)

1. Moskovskiy avtozavod im. Stalina.  
(Power presses)





SONIN, A.L., kandidat tekhnicheskikh nauk.

Study of rolling machines used in the straightening of thin sheet  
metal. [Trudy] TSNIITMASH no.78:30-73 '56. (MLRA 10:1)  
(Rolls (iron mills)) (Sheet metal)

SONIN, A.S.

Refraction of hydrogen bonds in inorganic compounds. II.  
 S. S. Batsanov and A. S. Sonin (M.V. Lomonosov State Univ., Moscow). *Khimicheskaya* 1, 321-7 (1966); *C.A.* 49, 8352b. — The change in the amt. of the refraction due to H bonds of the type  $xH...O$  is parallel to the change in the effective neg. charges of the O atoms. The  $n_D$  of the inorg. compds. are extrapolated first from measurements in the visible range to  $\lambda = \infty$  by the method given by P. Wulff, *C.A.* 27, 2146. From these  $n_D$  are calcd. the  $R_{\infty}$ , and the differences  $\Delta R_{\infty}$ , e.g.  $R_{\infty} - R_{\infty} = 1.60$  cc. (av. derived from the halides). Corresponding  $NH_4^+$  and K salts of oxyacids give corresponding  $n_D = \sqrt{n_{\infty}^2 + \Delta R_{\infty}}$  for the av.  $n_D$  and  $n_D$  for  $\lambda = \infty$ ,  $R_{\infty}$ , and  $\Delta R_{\infty}$  data. The latter are usually somewhat higher than the 1.60 cc. difference, and this excess (ER) in  $R_{\infty}$  is a measure of the fraction of the H bonds in the compds. The higher the field strengths (electronegativity) of the central atom, the higher is this ER value. For the H bond in the  $NH_4^+$  group with the symbol  $xH...O$  it varies between 0.17 and 0.50, and depends on the polarizing power of the central ion X in the oxyacid radical  $XO_4$ . For  $ClO_4^-$  it is 0.17, for  $AsO_4^{3-}$  it is 0.50. The higher the electronegativity of the central atom, the more covalent is the binding mechanism in the complex, and the lower the ER value. The ratio of the H-bond refraction in  $NH_4NO_3$  and in  $(NH_4)_2Co(NO_3)_6$  is about 1:8. In  $NH_4NO_3$  every O is connected with 2 H; in Co ammine complex compds. each O is connected only with 1 H. A comparison of the refractions for  $xH...O$  and  $OH...O$  in ice and in crystallized hydrates is interesting. The av.  $R_{\infty}$  for the latter = 3.42 cc., whereas in ice it =

2

Chen

6000

1/2

*S. S. Batsanov, and A. S. Lomon*

3.69 cc. The difference, 0.26, corresponds to 2 H bonds, i.e. for one H bond  $R(\text{OH} \dots \text{O}) = 0.13$  cc. In gypsum,  $\text{KH}_2\text{PO}_4 \cdot 3\text{H}_2\text{O}$ , and  $\text{SrCl}_2 \cdot 6\text{H}_2\text{O}$   $R_{\text{H}_2\text{O}} = 3.57, 3.67, 3.63$ , resp., i.e.  $R(\text{OH} \dots \text{O})$  in ice is lower. It is concluded that in these salts H bonds also exist of about the same kind as in ice, with equal or smaller refractions (0.13 to 0.07 cc.). III. S. S. Batsanov. *Ibid.* 329-33.—The calcus. of the refractions for H bonds  $\text{OH} \dots \text{N}$  and  $\text{NH} \dots \text{N}$  in ferro- and ferricyanides, azides, and thiocyanates are extended by extrapolations and differences (ER) by the method used in part II. In  $\text{K}_4\text{Fe}(\text{CN})_6 \cdot 3\text{H}_2\text{O}$  the  $R_{\text{H}_2\text{O}}$  is higher by 0.47 cc. than that of water of crystn. (3.42). This difference corresponds to 2 H bonds  $\text{OH} \dots \text{N}$  with a refraction of 0.24 cc. For the  $\text{NH}_4$  salts of  $\text{H}_2\text{Fe}(\text{CN})_6$ ,  $\text{H}_2\text{Fe}(\text{CN})_6$ ,  $\text{HN}_3$ , and  $\text{HCNS}$  the following  $R(\text{NH} \dots \text{N})$  are calcd. from the ER data: 0.24, 0.10, 0.14, 0.20 cc., resp. It is evident that the central  $\text{Fe}^{++}$  in  $[\text{Fe}(\text{CN})_6]^{4-}$  brings about a higher  $R(\text{NH} \dots \text{N})$  (0.24) than does the central  $\text{Fe}^{+++}$  in the ferricyanide complex anion (0.10). The high refraction in  $\text{NH}_4\text{CNS}$  demonstrates the excessive neg. charges on N in the CNS group:  $(\text{S} \equiv \text{C} \equiv \text{N})^-$ . Analogous considerations are valid for  $\text{N}_3^-$  ( $\text{N} \equiv \text{N} \equiv \text{N})^-$ . In every case, the rule is established that the refractions of H bonds of the type  $\text{H} \dots \text{N}$  and  $\text{O} \dots \text{H}$  are detd. by the amt. of the effective neg. charges of that atom that builds up the H bond. Therefore they vary parallel with the change in polarization strengths.

W. Eitel

2/2 LFH

Am

24(3), 24(2)

AUTHORS: Zheludev, I. S., Sonin, A. S.

SOV/48-22-12-7/33

TITLE: On the question of the Search for New Piezoelectrics (K voprosu o poiske novykh segnetoelektrikov)

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1958, Vol 22, Nr 12, pp 1441 - 1444 (USSR)

ABSTRACT: The search for new materials possessing piezoelectric properties is of topical interest for both science and technique. New piezoelectrics can only be found on the basis of essential characteristics marking the formation conditions of spontaneous polarization in the crystal. These characteristics are ascertained basing on the analysis of characteristic properties of known piezoelectrics. The existence of a domain structure can be considered as an essential characteristic feature. The phase transitions of the first or second type are also an important characteristic of piezoelectric properties. Piezoelectrics of the oxygen-octahedron type and those containing hydrogen compounds present other characteristic features.

Card 1/3 Smolenskiy-Mattias' crystallo-chemical characteristic

On the Question of the Search for New Piezoelectrics

SOV/49-22-12-7/35

(Refs 9,10) is regarded as belonging to the first type. Piezoelectrics containing hydrogen, make the problem more complicated. Here it is much more difficult to formulate the characteristics, because the mechanism leading to the formation of spontaneous polarization is very unclear (Ref 11). The chemical composition and its structure are moreover extremely complicated and varied. It was already earlier mentioned (Ref 13) that the symmetry variation of all piezoelectrics hitherto known which takes place during the phase transitions, is subject to certain rules. Symmetry variations of a few piezoelectrics during their phase transitions are given in table 1. This table is a supplement of the published data. (Ref 13). The conclusion has been drawn that a variation of point symmetry, belonging to one of the pyroelectric classes, can be held as a characteristic of piezoelectric phase transitions for all dielectrics. This characteristic is called the crystallographic feature of spontaneous polarization. Such materials were chosen in this work for which the variation of symmetry at phase transitions was known to be subject to the crystallographic characteristic (Table 2). In conclusion it is pointed out, however, that the mentioned characteristics

Card 2/3

On the Question of the Search for New Piezoelectrics SOV/48-22-12-7/33

are indeed necessary, but not sufficient. The search for new piezoelectrics is facilitated by them, but neither shortened nor theoretically completely substantiated. The next paper, therefore, will be dedicated to the investigating of piezoelectric properties of the materials recorded in table 2, as well as to the determination of optimum conditions of existence for spontaneous polarization in crystals. The authors thank L. Z. Rusakov, I. S. Rez, V. V. Gladkov for their assistance. There are 2 tables and 13 references, 4 of which are Soviet.

ASSOCIATION: Institut kristallografii Akademii nauk SSSR (Institute of Crystallography, Academy of Sciences USSR) TsNILP Komiteta po radioelektronike Soveta Ministrov SSSR (TsNILP of the Committee of Radioelectronics, Cabinet Council USSR)

Card 3/3

AUTHORS: Rez, I.S., Sonin, A.S., Tsepelevich, Ye.Ye. and  
Filimonov, A.A. <sup>SOV/70-4-1-11/26</sup>

TITLE: Experimental Investigations in Finding New Piezoelectric  
Materials (Eksperimental'nyye issledovaniya po vyyavleniyu  
novykh p'yezoelektrikov)

PERIODICAL: Kristallografiya, 1959, Vol 4, Nr 1, pp 65-68 (USSR)

ABSTRACT: Lists are given of materials tested for piezoelectricity  
(with a piezoelectric tester, PT-2). The authors found:  
39 inorganic and complex compounds showing marked piezo-  
effects; 43 inorganic and complex compounds with  
inappreciable piezoeffects; 90 organic compounds  
showing marked piezoeffects; 184 organic compounds  
showing inappreciable piezoeffects. There are 4 references,  
3 of which are Soviet and 1 English.

ASSOCIATION: TsNILP

SUBMITTED: December 7, 1958

Card 1/1



SOV/70-4-3-26/32

AUTHORS: Zheludev, I.S. and ~~Sonin, A.S.~~

TITLE: Rotation of Plane of Polarisation of Light and the Symmetry of Crystals

PERIODICAL: Kristallografiya, 1959, Vol 4, Nr 3, pp 425-429 (USSR)

ADSTRACT: The changes in the symmetry of crystals conditioned, in the general case, by the changes (appearance, change of sign, change of magnitude) in the specific rotation  $\rho$  of the plane of polarisation of light are investigated. The specific rotation in one direction is described by an axial tensor of symmetry  $\infty : 2$ . The gyration surface of a crystal can belong to one of the four symmetry groups  $2:2$ ,  $4.m$ ,  $\infty:2$  and  $\infty/\infty$ . The morphological symmetry groups of crystals which show rotation either coincide with these groups or their sub-groups. Point groups which can show rotation are  $1, 2, 3, 4, 6, 2:2, 3:2, 4:2, 6:2, m, 2.m, 4.m, 3/4, 3/2, 4$ . A change in the point symmetry of a crystal on phase transition conditioned by a change in the rotation can be found from Curie's principle (A.V. Shubnikov - Ref 4).

Card1/2

SOV/70-4-3-26/32

Rotation of Plane of Polarisation of Light and the Symmetry of Crystals

According to this principle the symmetry of the crystal on change of rotation can be determined as the highest common sub-group of the point group to which the crystal belongs in its initial state and the symmetry group of the gyration surface for the given disposition of the symmetry elements of both groups. Hence, for any of the 32 classes the change in symmetry connected with a change in rotation can be found. This is tabulated for all classes and for the 4 symmetries of gyration surface. There are 5 tables and 4 Soviet references.

ASSOCIATION: Institut kristallografii AN SSSR (Institute of Crystallography of the Ac.Sc., USSR)

SUBMITTED: March 17, 1959

Card 2/2

AUTHORS: Sonin, A.S. and Zheludev, I.S. SOV/70-4-4-5/34  
 TITLE: Spatial Symmetry and Ferroelectric Phase Transitions  
 PERIODICAL: Kristallografiya, 1959, Vol 4, Nr 4, pp 487-497 (USSR)  
 ABSTRACT: Tables are given showing, for each of the 230 space groups, the space groups which result when a crystal of the initial space group undergoes a ferroelectric transition developing a spontaneous polarisation  $P_0$  along one of the axes  $\langle 100 \rangle$ ,  $\langle 111 \rangle$ ,  $\langle 110 \rangle$ ,  $\langle hk0 \rangle$ ,  $\langle hkk \rangle$ ,  $\langle hhk \rangle$  or  $\langle hkl \rangle$  (for the cubic case) or other appropriate axes for the other crystal systems. Examples of 17 experimental transitions in various crystals are collected and all agree with the theoretical scheme. The tables can be used to predict the symmetry on transition, to limit the search for ferroelectric transitions or to find the directions of polarisation. The groups are obtained by taking the highest common sub-group of the symmetry group of the crystal class in the para-electric state and the symmetry group of the

Card1/2

SOV/70-4-4-5/34

Spatial Symmetry and Ferroelectric Phase Transitions

polar vector  $\vec{P}_c$ , of symmetry  $\infty.m$ , in the given orientation of crystal and polarisation symmetry elements. A ferroelectric in its polarised state can belong to one of only 68 space groups of the 10 pyroelectric classes (with polar directions). There are 7 tables and 19 references, of which 7 are Soviet, 8 English, 1 international, 2 German and 1 Japanese.

ASSOCIATION: Institut kristallografii AN SSSR (Institute of Crystallography of the Ac.Sc. USSR)

SUBMITTED: May 4, 1959

Card 2/2

PM51 : ROCK REP01:AT:000

6257/AGS

Ташкентский институт по линии де-эмиграции. 2д, 1936

Patla diabetibetare, truly sorry see: *Patla diabetibetare* (Physics of Diabetibetare) Translated by the 23 All-Union Committee on the Physics of Diabetibetare Moscow, 1960, 320 p. Extra slip inserted. 5,000 copies printed.

[illegible]

**PURPOSE:** This collection of reports is intended for scientific investigation of the physics of dislocation.

**CONTENTS.** The Second Atlantic Conference on the Physics of Polymers held in Moscow at the Physico-Technical Institute, Acad. P. N. Lebedev, September 1957, was attended by representatives of the Physico-Technical Institute, the USSR Academy of Sciences, and of other scientific centers of the USSR and of several other countries. This collection contains part of the reports presented at the conference and summarizes the discussion which followed. The reports in this collection deal with dielectric properties, losses, and polarization, and with specific dielectric properties of various crystalline, chemical compounds, and ceramics. Photoconductivity, ferroelectricity, and various relaxing and irrelaxing effects on dielectric properties are also treated. The volume contains a list of other papers presented at the conference dealing with photoacoustics, losses, and breakdown of dielectrics, which were published in the journal, *Izvestiya AN SSSR, seriya fizicheskaya*, 1957, no. 14, 24. No personalities are mentioned. References accompany each report.

Boleslav, G.A.; A.I. Afanas'yev, V.A. Lukov and G.M. Kuz'min  
Parroled crystals of complex composition (Institute of Semiconductors,  
45 1952)

**KERSEL, V. A.** Geometric Model for the Description of Polymorphic Phase Transitions in Crystals [Physics Division, Moscow State University] *Island N.Y. 1960* 607

Konstantinov, V. P., I. M. Sil'vinskaya, and E. J. Alababov. Domain Structure and Certain Physical Properties of Polarized Triglycine Sulfate Crystals [Institute of Crystallography, Academy of Sciences USSR, Moscow] 35

sonly A<sub>2</sub>, and Dolzner, J. G., see Crystallization Problems of Ferroelectric Crystals with a Proton Bond [Institute of Crystallography, Moscow] 360

Chernyy, B. A. Kinetic Properties of the  $\text{BaTiO}_3 - \text{Co}_2\text{O}_3$  System  
Verkhniy, B. A. Aleksandrova, A. I. L. D. Zhurav. *Abstracts in Chemistry*  
Oxides on the Electrical Properties of Barium Titanate 372

Днепропетровский Государственный университет (Днепропетровск State University)  
677

Zolotarev, I. M., I. S. Bog, I. S. Semak, V. I. Chalkov, V. M. Gerasimov, V. A. Kozlovskiy, and A. A. Litvinenko. Spectroscopic Properties of Quaternary-  
 Sulfonium-Salt Azo Dyes. *Journal of Organic Chemistry*, (USSR), 1969, 34, 11, 2269.  
 V. I. Semak, A. I. Labentsov, and I. S. Semak. Laboratory of Photochemistry, Institute of Crystallo-  
 graphy, USSR Academy of Sciences, Moscow.

393

Shawbury, Ya. E. and O. A. Driffler. Effect of Small Addition Agents W<sub>2</sub> on the Electrical Properties of Polymethyl Methacrylate (Diacrylate Series Esters)  
404

M. A. S. and V. N. Surzhevich. Problem of the Connection Between Electric Conductivity of Ferroelectric Crystals and Ferroelectric Centers' Action-  
the-Research Laboratory of Piezoelectrics, Moscow]

Case 1:15-cv-01001 Document 1-1 Filed 07/27/15 Page 1 of 1



Concerning the Dependence of the Dielectric  
Properties of Triglycidyl Ether Plates on  
Their Thickness

78115

SOV/70-5-1-24/30

... of the dependence of repolarization at room  
temperature. The test results are illustrated in  
Figs. 1 and 2. The figures reveal that for the plates  
... completely,  $\epsilon_r$  increases and  $P_s$  decreases  
... with the increasing thickness of  
specimens until it reaches 0.5 mm, and then remain  
... plates with cross-shaped electrodes,  
... The time required for  
repolarization increases almost linearly with the  
thickness of the plates. The defects resulting  
from the high temperature treatment of the surface  
... affect the properties of  
plates especially. The possible causes of the  
... are briefly reviewed. I. S.  
Zheludov and I. S. Re are acknowledged for guidance  
and I. V. Gavrilov for specimens. There are 3 figures;  
and 1 reference, 1 U.S., 1 U.K., 1 Soviet. The U.S.  
and U.K. references are: W. I. Merz, J. Appl. Phys.,  
44, 228 (1973); H. H. Wicks, Proc. IRE, 45, 1094 (1957);

00121

Generalizing the properties of the  
Properties of the electrolyte and the  
Their Thickness

76115  
30V/70-5-1-24/30

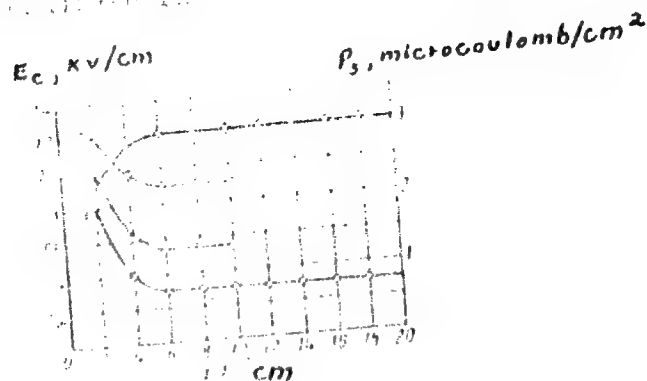


FIG. 1. Dependence of the spontaneous polarization and coercive field of triglycinesulfate on the thickness of specimens at room temperature and 50-cycle frequency. (1)  $E_c$  and (2)  $P_s$  for specimens completely covered with silver sublimates; (3)  $E_c$  and (4)  $P_s$  for specimens with cross-shaped electrodes.

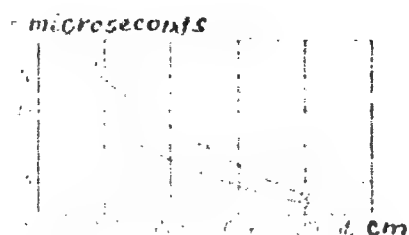
Card 3/4



Dependence of the Duration of Repolarization  
on the Thickness of Specimens

76115

SOV/70-5-1-24/30



Dependence of the duration of repolarization  
on the thickness of specimens.  
(1)  $E = 1 \text{ kv/cm}$ ; (2)  $E = 1.5 \text{ kv/cm}$ .

W. Rindler, *Proc. Roy. Soc. (1959)*; C. F. Pulvari,  
W. Rindler, *J. Appl. Phys.*, 33, 1742 (1968); M. Prutton,  
*Proc. Phys. Soc. (1968)*.

SUBMITTED: October 17, 1969

76115

9,2180

850 00

S/048/60/024/010/009/033  
B013/B063

AUTHORS: Sonin, A. S., Zheludev, I. S., Dobrazhanskiy, G. F.

TITLE: The Piezoelectric Properties of NaNO<sub>2</sub> ✓

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960,  
Vol. 24, No. 10, pp. 1209 - 1212

TEXT: The rule governing the variations of point symmetry during piezo-  
electric phase transitions, which was established by one of the authors  
and L. A. Shuvalov in Refs. 1 and 2, enabled the authors to develop a  
crystal-physical criterion for the determination of new piezoelectric  
substances. The question as to whether this criterion is really neces-  
sary and, if any, sufficiently exact, could not be answered so far  
and, therefore, requires further experiments on compounds with given  
changes of symmetry. Here, the authors describe the piezoelectric pro-  
perties of NaNO<sub>2</sub>. The sodium nitrate monocrystals bred by I. V.

Gavrilova at the beginning of 1958 could, due to their high electrical  
conductivity, not be used for dielectric measurements. The crystals

Card 1/3

The Piezoelectric Properties of  $\text{NaNO}_2$ 

85000

S/048/60/024/010/009/033

B013/B063

examined in the present work were grown from a chemically pure trade-marked material melting at  $271^\circ\text{C}$ , using a modified method described by Obreimov and Shubnikov in Ref.10. The measurements were made by means of Vobzer's water thermostat between room temperature and  $100^\circ\text{C}$  and by means of a thermostat filled with an organo-silicon solution No. 5 between  $100^\circ$  and  $200^\circ\text{C}$ . The dielectric constant was measured at 500 kilocycles. Figs. 1 and 2 show the temperature dependence of the dielectric constant on three crystallographic axes. It may be seen that the dielectric constants have distinct peaks at the phase-transition temperatures. A Scheme providing for the compensation of conductivity (Ref.11) was used to study the dielectric hysteresis loops at 50 cycles. The shape of the hysteresis loop at  $165^\circ\text{C}$  (Fig.3) is indicative of the high conductivity of the crystal. Spontaneous polarization and coercive force were calculated from the hysteresis loops. The temperature dependences of these quantities are illustrated in Figs. 4 and 5. The shape of the hysteresis loops and the temperature dependence of the coercive force indicate the considerable hardness of  $\text{NaNO}_2$  between room temperature and  $147^\circ\text{C}$ , the spontaneous polarization and the coercive

Card 2/3

85000

The Piezoelectric Properties of  $\text{NaNO}_2$

S/048/60/024/010/009/033  
B013/B063

force decreasing near the Curie point. The deviation of the authors' results from the values mentioned in Ref.9 is related to the varying conditions of crystal growth. The authors thank Y. I. Pakhomov and G. M. Lobanova for the preparation of the samples; I. Fenina for assistance in the experiments; and L. A. Shuvalov and I. S. Rez for a discussion of the measurements. The present paper was read at the Third Conference on Piezoelectricity, which took place in Moscow from January 25 to 30, 1960. There are 5 figures and 11 references: 6 Soviet. ✓

ASSOCIATION: Institut kristallografii Akademii nauk SSSR (Institute of Crystallography of the Academy of Sciences USSR)

Card 3/3

S/030/61/000/003/005/013  
B105/B215

AUTHORS: Sheftal', N.N., Doctor of Geological and Mineralogical  
Sciences, Sonin, A.S.

TITLE: Scientific Council for the problem of the  
"Formation of Crystals"

PERIODICAL: Vestnik Akademii nauk SSSR, no. 3, 1961, 106 - 107

TEXT: Two All-Union Conferences on the growth of crystals are mentioned and it is found that conferences alone do not guarantee progress in the investigation of this field. The Scientific Council therefore decided to supplement these conferences on the problem of the "formation of crystals" by symposia with a restricted number of participants and reports. In 1960, three symposia were held in the Institut kristallografii (Institute of Crystallography) which were attended by representatives of academic institutes, departmental scientific research institutes, and schools of higher education of various cities of the country. The first symposium on metallic single crystals was held from October 24 to 26, 1960. Some problems on the growth of single crystals of perfect structures, and specific

Card 1/3

S/030/61/000/003/005/013  
B105/B215

Scientific Council for the ...

problems on the crystallization kinetics of metallic crystals were discussed. Characteristics of this symposium were the combination of scientific and technological reports and useful discussions at a high theoretical level. The second symposium on piezo- and ferroelectric crystals took place between November 14, and 18, 1960. Problems on the relation between structure and ferroelectric properties were discussed, and also studies on new piezo- and ferroelectric crystals which are of great importance for industrial purposes. The influence of defects on the electrophysical properties of crystals, and problems of growth and some properties of paramagnetic crystals were studied. The third symposium on the growth of semiconducting crystals was held on November 28, and 29, 1960. Reports were given on the most important technological and theoretical problems of growing single crystals, and on new principles of crystal growth. Some basic problems of the technique of growth and the production and examination of new semiconducting compounds were discussed. The participants of the symposia approved of the initiative of the Scientific Council and emphasized the necessity of such systematic meetings of scientists. In future, 10 to 12 symposia annually are planned to be organized by the department of the

Card 2/3

S/070/61/006/001/008/011  
E032/E314

24.7800

AUTHOR: Sonin, A.S.

TITLE: Antiferro-electric Properties of  $\text{NH}_4\text{I}$  and  $\text{NH}_4\text{Br}$   
Crystals

PERIODICAL: Kristallografiya, 1961, Vol. 6, No. 1,  
pp. 137 - 139

TEXT: The known structures and physical properties of  $\text{NH}_4\text{I}$  and  $\text{NH}_4\text{Br}$  are analysed to show that they are typical antiferro-electrics in the sense defined by C. Kittel (Phys. Rev., 82, 729, 1951 - Ref. 1). It is pointed out that studies of the electrical properties of these compounds are being carried out by the present author. Acknowledgments are expressed to I.S. Zheludev and L.A. Shuvalov for valuable advice. There are 2 figures and 17 references: 4 Soviet and 13 non-Soviet.

SUBMITTED: May 30, 1960

Card 1/1

✓B

22790

S/070/61/006/003/001/009  
E081/E441

24.7100(1153, 1136, 1142)

AUTHORS: Shuvalov, L.A. and Sonin, A.S.

TITLE: On the question of the crystallography of antiferroelectrics

PERIODICAL: Kristallografiya, 1961, Vol.6, No.3, pp.323-330

TEXT: On the basis of a formal investigation of the configuration of the antipolarization vectors, the crystallographic classification, the geometry of the domain structure, the possible point groups and the symmetry characteristics of antiferroelectrics are considered. An antiferroelectric crystal is formed as a result of phase transition from a paraelectric phase by slight distortion of the initial pseudosymmetrical structure. This structure can be represented by an even number of sublattices such that the polarizations are equal but oppositely directed in pairs. In the simplest type of antiferroelectric (for example tungsten oxide,  $WO_3$ ), there are two sublattices, and an antiferroelectric of this type may belong to any crystallographic class, except the cubic classes. An antiferroelectric has a centre of symmetry only if there is a centre in the paraelectric phase, and if the paraelectric

X

Card 1/3



22790  
S/070/61/006/003/001/009  
E081/E441

On the question of ...

phase is piezoelectric, the antiferroelectric phase is also piezoelectric. Thus, neither the presence of a centre of symmetry nor the absence of piezoelectricity is a certain indication of antiferroelectricity. Twinning is observed in many antiferroelectrics, and the separate components of the twin form antiferroelectric domains. Consideration of spontaneous polarization and antipolarization shows that an antiferroelectric with two sublattices cannot be formed by transition from a paraelectric phase belonging to one of the classes:  $1, \bar{2}, 2, m, 3, 3:2, 3 \cdot m, 3: m$ . The possible symmetry classes corresponding to two- and three-dimensional antipolarization and to transition from the paraelectric to the antiferroelectric phase are also discussed. Finally the polarization scheme and symmetry properties of crystals which can simultaneously show ferroelectric and antiferroelectric behaviour are examined. Acknowledgments are expressed to I.S.Zheludev and V.A.Koptsik for advice and discussion. There are 3 figures and 22 references: 12 Soviet-bloc and 10 non-Soviet-bloc. The four most recent reference to English language publications read as follows: G.Shirane, R.Pepinsky, Phys.Rev., 91, Card 2/3

22790

S/070/61/006/003/001/009  
E081/E441

On the question of ...

218, 1953; L. Cross, B.J. Nickolson, Philos. Mag., 46, 453, 1955;  
E.A. Wood, W.J. Merz, B.T. Matthias, Phys. Rev., 87, 544, 1954;  
F. Jona, G. Shirane, F. Mazzi, R. Pepinsky, Phys. Rev., 105, 849, 1957.

ASSOCIATION: Institut kristallografii AN SSSR  
(Institute of Crystallography AS USSR)

SUBMITTED: October 22, 1960

X

Card 3/3

SONIN, A.S.

First symposium on research on the production of ~~ferroelectric~~  
and piezoelectric crystals. Kristallografiia 6 no.4:650-651  
Jl-Ag '61. (MIRA 14:8)  
(Piezoelectric substances) (Ferroelectric substances)  
(Crystals---Growth)

L5677

S/070/63/008/001/009/024  
E132/E460

24.2130 24.7800

AUTHORS: Sonin, A.S., Zheludev, I.S.

TITLE: The investigation of certain dielectric properties of single crystals of sodium nitrite

PERIODICAL: Kristallografiya, v.8, no.1, 1963, 57-62

TEXT: Ferroelectricity in  $\text{NaNO}_2$  was predicted by the authors in 1957. Crystals grown from solution were used first but were unsatisfactory because of high electrical conductivity. The dependence on temperature of dielectric constants, spontaneous polarization, coercive force, electric conductivity and piezoelectric properties of single crystals of sodium nitrite were investigated. The crystals used were made from the melt in closed ampules from salt which had been earlier dried in vacuo at a high temperature. They were non-hygroscopic. They cleaved easily parallel to (101). Plates of other orientations were thus difficult to prepare. Electrodes were applied by evaporating silver. The dielectric constants were measured at 500 Kc/s and, at room temperature, were  $\epsilon_a = 6.8$ ,  $\epsilon_b = 6.4$  and  $\epsilon_c = 7.8$ ; at  $170^\circ\text{C}$  a  $\lambda$ -point was found in the curve for  $\epsilon_c$

Card 1/2

The investigation of certain ...

S/070/63/008/001/009/024  
E132/E460

which rose to above 800. Above the Curie point of  $161^{\circ}\text{C}$   $\epsilon_c$  obeys the Curie-Weiss law.  $\epsilon_a$  and  $\epsilon_b$  show discontinuities of slope at the Curie point but do not exceed 14. The hysteresis loop was plotted at various temperatures. At room temperature the coercive force is higher than could be applied. Above  $120^{\circ}\text{C}$  the hysteresis loop could be observed. The spontaneous polarization was measured as 8 microcoulombs/cm<sup>2</sup> and at  $150^{\circ}\text{C}$  the coercive force was 2 kV/cm changing linearly with temperature. The piezoelectric moduli were measured,  $d_{33}$  being  $4.4 \times 10^{-8}$  cgsu at room temperature. It changed little until above  $160^{\circ}\text{C}$  when a rapid fall to zero occurred. The electrical conductivity followed the law,  $\log s = k/T$ , giving an energy of activation of 0.72 eV above the Curie point and 0.90 in the ferroelectric region. Nonlinear effects were found when the susceptibility was measured as a function of field at 1 Kc/s. The behaviour of  $\text{NaNbO}_3$  is to be compared with that of  $\text{KNO}_3$  where there is also no hydrogen. The ferroelectricity and the transition appears to be connected with ordering of the  $\text{NO}_2$  groups. There are 9 figures.

ASSOCIATION: Institut kristallografi AN SSSR (Institute of  
SUBMITTED: May 5, 1962 Crystallography AS USSR).  
Card 2/2

S/070/63/008/002/014/017  
E039/E435

AUTHORS: Sonin, A.S., Zheludev, I.S.

TITLE: The dielectric properties of  $\text{CsNO}_3$  single crystals

PERIODICAL: Kristallografiya, v.8, no.2, 1963, 285-287

TEXT: The single crystals used are grown from a melt.  $\text{CsNO}_3$  crystals are cleavable along the (0001) plane and this facilitates the orientation of samples. This is verified by means of the Laue X-ray diffraction method. Measurements of the dielectric constant are made in directions perpendicular and parallel to the third order axis ( $\epsilon_c$  and  $\epsilon_a$  respectively). Samples 1 mm thick are used with silver coatings for electrodes. The dependence of the dielectric constants  $\epsilon_c$  and  $\epsilon_a$  on temperature are measured. At room temperature using 500 kc/s  $\epsilon_c = 8.8$  and  $\epsilon_a = 9.4$ . These values increase with temperature and the anisotropy decreases to a negligible value at  $140^\circ\text{C}$ . At  $154^\circ\text{C}$  there is a phase change which results in a sharp jump in  $\epsilon$  from 11.8 to 12.3. In addition, there is a sharp increase in the electrical conductivity. Above and below this transition the electrical conductivity follows the law  $\sigma = \sigma_0 \cdot \exp(-W/T)$ . The dependence of the piezoelectric modulus  $d_{33}$  on temperature is

Card 1/2

The dielectric properties ...

S/070/63/008/002/014/017  
E039/E435

also investigated. At room temperature  $d_{33} = 1.4 \times 10^{-8}$  cgsu, decreasing rapidly with increase in temperature until at 125°C it is too small to measure. Preliminary measurements are also made on  $\text{RbNO}_3$ . There are 3 figures.

ASSOCIATION: Institut kristallografii AN SSSR  
(Institute of Crystallography AS USSR)

SUBMITTED: May 5, 1962

Card 2/2

SONIN, A.S.; ZHELUDEV, I.S.

Isomorphism and ferroelectric properties. Rost krist. 4:  
203-208 '64. (MIRA 17:8)



L 36341-65 EWG(j)/EWA(k)/FBD/EWT(l)/EPA(a)-2/EWT(m)/EEC(k)-2/EEC(t)/T/EWP(t)  
 EEC(b)-2/EWP(k)/EWP(b)/EWA(m)-2/EWA(h)/EWA(c) Pn-4/Po-4/Pf-4/Pt-10/PeB/Pi-4  
 ACCESSION NR: AP5008474 PI-4 IJF(c) WG/JD/JG S/0070/65/010/002/0255/0256

AUTHOR: Filimcnov, A. A.; Lomova, L. G.; Suvorov, V. S.; Pakhomov, V. I.; Sonin,  
 A. S. 81

TITLE: Second harmonic generation in potassium iodate monocrystals B

SOURCE: Kristallografiya, v. 10, no. 2, 1965, 255-256

TOPIC TAGS: laser, ruby laser, nonlinear optics, harmonic generation, second  
 harmonic, potassium iodate, nonlinear effect, optical harmonic

ABSTRACT: A second harmonic generation in crystals of potassium iodate illuminated  
 by a ruby laser emission ( $\lambda = 6943 \text{ \AA}$ ) is reported. Maximum generation was in the  
 [102], [120], and [012] directions and was of the same order of magnitude as that  
 observed in ADP crystals in the direction of matching indices. The determination  
 of the direction of matching indices in  $\text{KIO}_3$  crystals was difficult because of low  
 crystal symmetry and the difficulty of measuring refraction indexes. The minimal  
 refraction indexes for the  $D_{Na}$  line with laser emission propagation in the [100],  
 [010] and [011] directions were 1.7281, 1.7274, and 1.7278, respectively. The  $\text{KIO}_3$   
 crystals exhibited high birefringence. It was determined from absorption spectra  
 that the crystals were transparent between 0.4 and 6.2  $\mu$ . [CS]

Card 1/ 2

L 36341-65

ACCESSION NR: AP5008474

0

ASSOCIATION: none

SUBMITTED: 06Jul64

ENCL: 00

SUB CODE: 6,88

NO REF SOV: 002

OTHER: 002

ATD PRESS: 3219

Card 2/2

SONIN, A.S.; ZHELUDEV, I.S.

Dielectric properties of boracite single crystals. Kristallo-  
grafiia 8 no.2:283-285 Mr-Apr '63.

Dielectric properties of cesium nitrate single crystals.  
Ibid.:285-287 (MIRA 17:8)

1. Institut kristallografi AN SSSR.

LOMOVA, L.G.; SONIN, A.S.

Changes in the optical indicatrix of triglycine sulfate single  
crystals in phase transitions. Kristalografiia 10 no.2:251-252  
Mr-Apr '65. (MIRA 18:7)